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# From Catesby's Land Frog to *Anaxyrus terrestris*: Reevaluating the Type Specimen of the Southern Toad

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## Introduction

The Southern Toad, *Anaxyrus terrestris* (Bonnaterre, 1789), is an abundant anuran in the coastal plains of the southeastern United States (Dorcas and Gibbons, 2008; Elliott et al., 2009). Their short limbs and thick, warty skin make them well adapted to a terrestrial lifestyle, earning them their species name. Yet, the taxonomic origin of the epithet presents problems.

Pierre Joseph Bonnaterre officially described the species *Rana terrestris* in his 1789 publication, *Tableau Encyclopédique et Méthodique des Trois Règnes de la Nature: Erpétologie*. His official description referenced an account and illustration titled "*Rana terrestris*" published by Mark Catesby in Volume 2., Part 9., Plate 69 (Fig. 1) in *Natural History of Carolina, Florida, and the Bahama Islands* (Catesby, 1729–43; Bonnaterre, 1789; Frost, 2025; Schmidt, 1953). Bonnaterre's use of Catesby's account designated it the type specimen for *Anaxyrus terrestris*, making Catesby's "*Rana terrestris*" the definitive reference for this species.

Type specimens are usually museum or herbarium specimens, but in some cases, naturalists' illustrations serve this purpose, including many of Catesby's depictions (International Commission of Zoological Nomenclature, 1999). In most cases, Catesby's accounts provide enough detail to serve effectively as type specimens, but the ambiguous nature of "*Rana terrestris*" is problematic and calls into question its suitability for serving this role. Arguably, "*Rana terrestris*" inaccurately represents *Anaxyrus terrestris* and likely depicts a different species altogether. We do not intend to suggest a name change for the species but aim to highlight the flaws in Catesby's print as representative of *Anaxyrus terrestris* and discuss the nuances of referencing historical naturalist accounts.

## Catesby's Impacts on Modern Taxonomy

Few early naturalists have had as profound an impact on the natural history of the southeastern United States as Catesby (1683–1749). He made two trips to the New World collecting, documenting, and painting dozens of plants and animals. These paintings adorned his seminal publication, *Natural History of Carolina, Florida and the Bahama Islands,* and provided early accounts of many birds, mammals, reptiles, amphibians, fish, insects, and plants of the New World. It is still highly regarded by naturalists today.

Linnaeus, the father of modern taxonomy, relied on the works of early New World naturalists to taxonomically arrange new species. He referenced numerous Catesby prints while compiling his foundational publications *Systema Naturae* (1758; 1766), *Genera plantarum* (1737), and *Species plantarum* (1753). Catesby's artworks serve as Linnaeus' principle authority for 139 species and the sole reference for 52 species (Adler, 2015).

Despite his significant contribution to the foundation of modern taxonomy, more recent analysis of his work has shown many of Catesby's herpetological illustrations to be inaccurate, misleading, or composites of multiple species, making them ill-suited type specimens. An in-depth analysis of Catesby's snake prints showed the challenges of identifying snakes in Catesby's work, and pointed out that many snake illustrations were likely blendings of multiple species (McKeever, 2023).

Even Linnaeus, who clearly valued Catesby's work, was hesitant to use his reptile and amphibian prints as type specimens, recognizing the necessity of intricate details, such as scale count, to properly classify herpetofauna (Adler, 2015). Such detail was inconsistently or inaccurately recorded by Catesby, leading to Linnaeus' reluctance to use his reptile and amphibian accounts. Alexander Garden, a physician and naturalist in Charles Town who corresponded with and contributed to Linnaeus' work, was an outspoken critic of Catesby. He deemed most of Catesby's work unusable for referencing the herpetofauna of the Carolinas and made his opinions clear in correspondence (Berkeley and Berkeley, 1969). Holbrook, a renowned herpetologist from South Carolina, respected Catesby's contributions, but similarly criticized his herpetological illustrations (Holbrook, 1838). In the general remarks section of "*Elaps fulvius*" he stated:

> "*Catesby did much; his drawings were done in the infancy of the art, as applied to natural history, and those of his reptiles [and amphibians] and fishes are the very worst part of his work.*"

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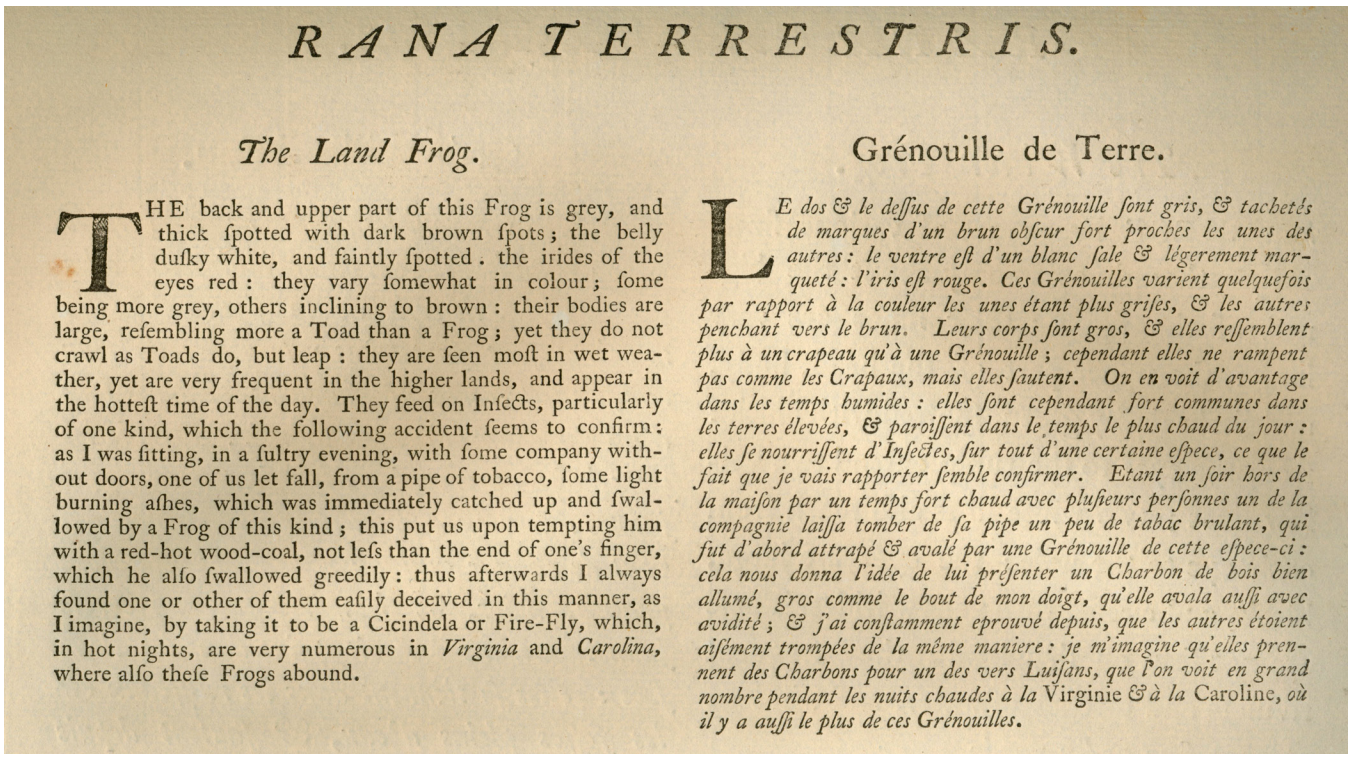
**Fig. 1.** Plate of "*Rana terrestris*" published by Mark Catesby in Volume 2. Part 9. Plate 69 in *Natural History of Carolina, Florida, and the Bahama Islands* (Rare Book Division, The New York Public Library)



RANA TERRESTRIS.

*The Land Frog.*

THE back and upper part of this Frog is grey, and thick ſpotted with dark brown ſpots; the belly duſky white, and faintly ſpotted. the irides of the eyes red: they vary ſomewhat in colour; ſome being more grey, others inclining to brown: their bodies are large, reſembling more a Toad than a Frog; yet they do not crawl as Toads do, but leap: they are ſeen moſt in wet weather, yet are very frequent in the higher lands, and appear in the hotteſt time of the day. They feed on Inſects, particularly of one kind, which the following accident ſeems to confirm: as I was ſitting, in a ſultry evening, with ſome company without doors, one of us let fall, from a pipe of tobacco, ſome light burning aſhes, which was immediately catched up and ſwallowed by a Frog of this kind; this put us upon tempting him with a red-hot wood-coal, not leſs than the end of one's finger, which he alſo ſwallowed greedily: thus afterwards I always found one or other of them eaſily deceived in this manner, as I imagine, by taking it to be a Cicindela or Fire-Fly, which, in hot nights, are very numerous in *Virginia* and *Carolina*, where alſo theſe Frogs abound.

Grénouille de Terre.

*LE dos & le deſſus de cette Grénouille ſont gris, & tachetés de marques d'un brun obſcur fort proches les unes des autres: le ventre eſt d'un blanc ſale & légerement marqueté: l'iris eſt rouge. Ces Grénouilles varient quelquefois par rapport à la couleur les unes étant plus griſes, & les autres penchant vers le brun. Leurs corps ſont gros, & elles reſſemblent plus à un crapeau qu'à une Grénouille; cependant elles ne rampent pas comme les Crapaux, mais elles ſautent. On en voit d'avantage dans les temps humides: elles ſont cependant fort communes dans les terres élevées, & paroiſſent dans le temps le plus chaud du jour: elles ſe nourriſſent d'Inſectes, ſur tout d'une certaine eſpece, ce que le fait que je vais rapporter ſemble confirmer. Etant un ſoir hors de la maiſon par un temps fort chaud avec pluſieurs perſonnes un de la compagnie laiſſa tomber de ſa pipe un peu de tabac brulant, qui fut d'abord attrapé & avalé par une Grénouille de cette eſpece-ci: cela nous donna l'idée de lui préſenter un Charbon de bois bien allumé, gros comme le bout de mon doigt, qu'elle avala auſſi avec avidité; & j'ai conſtamment eprouvé depuis, que les autres étoient aiſément trompées de la méme maniere: je m'imagine qu'elles prennent des Charbons pour un des vers Luiſans, que l'on voit en grand nombre pendant les nuits chaudes à la* Virginie *& à la* Caroline, *où il y a auſſi le plus de ces Grénouilles.*

**Fig. 2.** Text accompanying Plate 69, "*Rana terrestris*" in *Natural History of Carolina, Florida, and the Bahama Islands* by Mark Catesby.

It is undeniable that Catesby's contributions to natural history and modern taxonomy are significant, but we recognize these critiques of Catesby's herpetological prints and accounts. We assert that similar issues exist for the type specimen of *Anaxyrus terrestris*, Catesby's "*Rana terrestris.*"

## An Analysis of Catesby's "Rana terrestris"

In his written account for "*Rana terrestris*", Catesby pointed out the resemblance to a "Toad", likely drawing comparisons to the Common Toad (*Bufo bufo*) found throughout much of Europe. He remarked that these animals "do not crawl as toads do, but leap," a behavior consistent with bufonids found in South Carolina. However, the descriptor is not accurate enough to isolate to species level, and the remainder of the account is equally, if not more, ambiguous.

Catesby went on to provide additional characteristics and habits in his account of "*Rana terrestris*" (Fig. 2). Notably, he described and illustrated the "irises of the eyes red," a characteristic that does not appear in *Anaxyrus terrestris*, which presents golden irises. Red eyes are not a common trait for any frog species in South Carolina, aside from tadpoles of *Lithobates heckscheri*. Similar inaccuracies appeared in other reptile and amphibian accounts, such as his depiction of the "Black Viper," presumably *Heterodon platirhinos* depicted on plate 44, in which deep red eyes were illustrated despite the species typically exhibiting golden or dark irises. No evidence suggests Catesby suffered from color blindness, as demonstrated by his accurate depiction of bird eye colors. For example, the "Oyster Catcher" on Plate 85 in volume 1, featured golden irises with a bold orange eye ring, and the "Towhe Bird" on Plate 34 displayed red irises—both consistent with living specimens of the American Oystercatcher and Eastern Towhee, respectively. Why Catesby misrepresented iris colors in several reptile and amphibian illustrations remains unclear.

He also noted that this animal appears during the hottest time of the day, is most frequent in wet weather, and is common in the "higher lands." Though these traits align with *Anaxyrus terrestris*, they are not exclusive to this species and the habitat descriptor, "higher lands," offers little ecological specificity. In a section titled "Of the Soyl of Carolina" Catesby described the higher lands as areas where the marsh creeks begin to subside, but fails to provide substantial floral descriptors as he does later in this section. The "Higher lands" descriptor is used twice more across his works, serving as the habitat descriptor for "The Live Oak" and "The Black Viper" (*Quercus virginiana* and possibly *Heterodon platirhinos*, respectively), which share habitats with *Anaxyrus terrestris*, but are also found alongside other similar species such as *Anaxyrus quercicus*.

In the preface pages of his book, Catesby references "upper parts," described as the uninhabited inland areas beyond the fall line. Catesby took trips into this area out of Fort Moore—modern-day North Augusta, South Carolina—and traveled towards the mountains. If "higher lands" refers to or extends to these same areas, it becomes possible that he was describing *Anaxyrus fowleri* or *Anaxyrus americanus*, because *Anaxyrus terrestris* becomes scarce above the fall line (Dorcas and Gibbons, 2008). Unfortunately, there is no clear designation for the habitat type described and this vagueness

**Fig. 3.** Comparison image between Mark Catesby's print of "*Rana terrestris*" (left), *Anaxyrus terrestris* (middle), and *Gastrophryne carolinensis* (right).

makes it challenging to infer the specific species of anuran Catesby was describing.

An analysis of the illustration of "*Rana terrestris*" further compounds the ambiguity of Catesby's account. None of the characteristics represented in the illustration match any individual species, raising suspicions that it is a composite, blending features from multiple species. The rotund body and compressed head more accurately depict *Gastrophryne carolinensis*, another common anuran in the coastal plains of South Carolina (Fig. 3). The faint pale dorsal line from snout to vent resembles markings found on *Anaxyrus terrestris* and other bufonids like *Anaxyrus quercicus*, *Anaxyrus fowleri*, and *Anaxyrus americanus*. Unfortunately, there is not enough detail in the illustration to determine key features such as cranial crests, supraorbital ridges, paratoid glands, or wart arrangement, which are necessary to distinguish between similar species in the region (Dorcas and Gibbons, 2008; Elliott et al., 2009).

Catesby's description provides little clarity on the exact location from which the subject animal was observed. The illustration lacks distinguishing characteristics necessary to confidently identify it as *Anaxyrus terrestris*, *Anaxyrus fowleri*, *Anaxyrus quercicus*, or *Anaxyrus americanus*. Moreover, several traits in the illustration more closely resemble *Gastrophryne carolinensis* than any native bufonid species. As such, we propose that the depicted and described anuran is likely a composite representation, blending features of multiple species rather than an accurate portrayal of *Anaxyrus terrestris*.

## Nomenclature History of terrestris as it Relates to Catesby's "Land Frog"

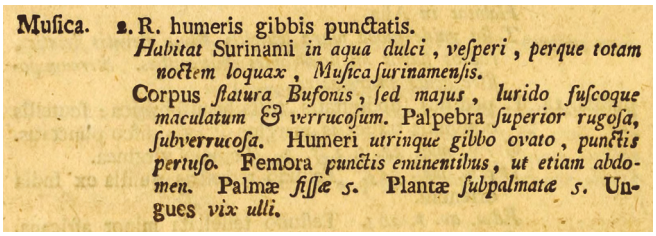
The link between Catesby's *Rana terrestris* and the modern *Anaxyrus terrestris* is rooted in a long, convoluted nomenclatural history. Blem (1979) provides a detailed account of this history in the *Catalogue of American Amphibians and Reptiles*, with further updates by Frost (2025). Building on these works, the following overview traces the tangled path from early misidentifications to the modern use of the epithet *terrestris*.

The earliest modern epithet associated with the species was *musica*, assigned by Linnaeus in the 12th edition of *Systema Naturae* (Fig. 4). His description, translated, portrays a large, warty, toad-like frog that was "noisy throughout the night" and found in the freshwaters of Suriname. The origin of this Surinamese locality is uncertain, but possibly traces to Patrick Browne's *The Civil and Natural History of Jamaica* (1756; Fig 5a & 5b). Describing what was likely *Osteopilus ocellatus*, Browne conflated three unrelated species: a Brazilian frog described by Piso (1648), Catesby's *Rana terrestris* (plate 69) from the southeastern U.S., and Linnaeus's *Rana dorso pullifero* (listed with the synonym "*Pipa*") from Suriname, introduced in his 6th edition of *Systema Naturae* (1748).

The confusion deepened in the 10th and 12th editions of *Systema Naturae*, when Linnaeus cited Browne to describe *Rana ocellata* and further referenced species from multiple continents, including Seba's *Rana marina* (*Rhinella marina*), Catesby's *Rana maxima* (*Lithobates catesbeianus*), and Kalm's *Rana halecina* (*Lithobates sphenocephalus* or *Lithobates pipiens*). Garman (1888) later noted that this description for a single species referenced at least seven species, two of them from Catesby alone.

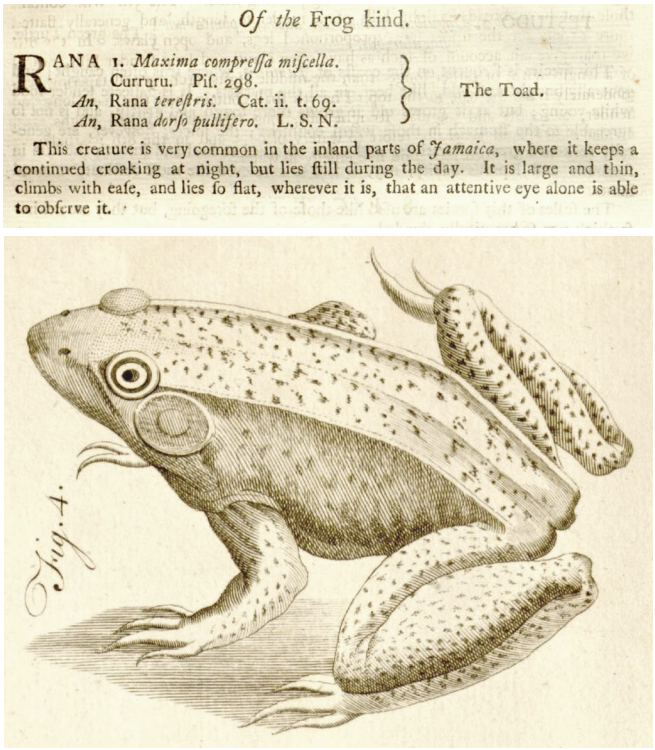
Although *Rana ocellata* is not directly tied to the *terrestris* lineage, Browne's use of Catesby's plate 69 to describe this Jamaican frog—while also referencing a Surinamese frog ("*Pipa*")—suggests that Linnaeus's *Rana musica*, which used Suriname as the locality, was shaped by this network of errors. To compound this point, Linnaeus states *Rana musica* is "noisy throughout the night." Having never traveled to the Americas to observe these frogs alive in the wild, Linnaeus must have relied on the works of another observer. Browne's description is strikingly similar, noting that the frog "keeps a continued croaking at night".

The type specimen for *Rana musica* is unclear and an important missing puzzle piece from this taxonomic story. Shaw (1802) described a "Doubtful Toad" (*Rana dubia*) from



Mufica. 2. R. humeris gibbis punctatis.
*Habitat* Surinami *in aqua dulci, veſperi, perque totam noctem loquax, Muſica ſurinamenſis.*
Corpus *ſtatura Bufonis, ſed majus, lurido fuſcoque maculatum & verrucoſum.* Palpebra *ſuperior rugoſa, ſubverrucoſa.* Humeri *utrinque gibbo ovato, punctis pertuſo.* Femora *punctis eminentibus, ut etiam abdomen.* Palmæ *fiſſæ 5.* Plantæ *ſubpalmatæ 5.* Ungues *vix ulli.*

**Fig. 4.** Original description of *Rana musica* in Linnaeus 1766.



*Of the* Frog kind.

RANA 1. *Maxima compreſſa miſcella.* Curruru. Piſ. 298. *An,* Rana *tereſtris.* Cat. ii. t. 69. *An,* Rana *dorſo pullifero.* L. S. N. } The Toad.

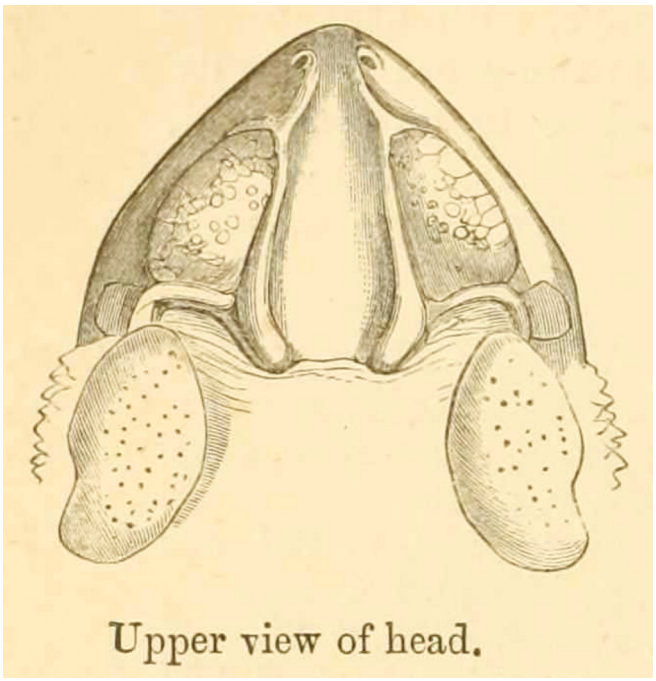
This creature is very common in the inland parts of *Jamaica*, where it keeps a continued croaking at night, but lies ſtill during the day. It is large and thin, climbs with eaſe, and lies ſo flat, wherever it is, that an attentive eye alone is able to obſerve it.

Fig. 4.

**Fig. 5a and b.** Original text and figure of the frog described by Browne 1756.

a British Museum specimen labeled *Rana musica*. Unfortunately, that specimen has since been lost, preventing verification of its identity. Later, in the *Catalogue of Batrachia Salientia s. Ecaudata in the Collection of the British Museum,* an entry labeled *Bufo musicus*, a variation of *Bufo lentiginosus*, includes a detailed sketch of the head that clearly and accurately depicts the supraorbital ridges of *Anaxyrus terrestris* (Fig. 6; Boulenger 1882). The specimens upon which that account was based had been collected from North America by entomologist Edward Doubleday decades after Linnaeus described the toad, making the locality accurate. This raises the possibility that the earlier British Museum specimen used by Shaw for *Rana dubia* could have been *Anaxyrus terrestris*, and perhaps even the specimen that influenced Linnaeus' *musica*—though evidence is lacking.

Despite the uncertainty, many authors have interpreted *Rana musica* as today's *Anaxyrus terrestris*, despite Linnaeus's claim that it inhabited Suriname. Daudin (1802) and Merrem (1820) adopted *musica* (modified to *musicus* under the genus *Bufo*), and Daudin may have been the first to clear-



Upper view of head.

**Fig. 6.** Dorsal view of the head showing the cranial crests of *Bufo musicus* in Boulenger 1882.

CAROLINA TOAD.

**Fig. 7.** Shaw's illustration of *Rana lentiginosa* 1802.

ly associate Linnaeus's *musica* with Catesby's "Land Frog." Holbrook (1836), however, rejected the name *musica(us)* on biogeographic grounds, questioning the likelihood that a single toad species could inhabit both North and South America. Instead, he proposed *Bufo clamosus*, crediting Schneider (1799). Holbrook later realized that Schneider's *clamosus* was itself based largely on Linnaeus's *musica*, and in 1838 he replaced it with *lentiginosus* (Shaw, 1802), who had drawn directly from Catesby's "Land Frog" description. Shaw's accompanying illustration depicts an anuran very similar to, and equally as ambiguous as, Catesby's print—suggesting that he relied exclusively on Catesby's plate as his reference (Fig. 7). Holbrook, while adopting Shaw's epithet, nevertheless recognized the issues with the account and criticized Catesby's plate 69, describing it as "badly executed, both as to drawing and colouring."

LeConte, in his 1855 *Descriptive catalog of the Rana of the United States*, reverted to using *Bufo musicus* for this species stating that Holbrook's usage of Shaw's *lentiginosus,* tied to Catesby's plate 69, was incorrect and referred to a different species. Referencing a single frog found in Georgia, he placed *lentiginosus* in the genus *Telmatobius*, presumably due to the presence of "small and imperfect vomerine teeth"—teeth are present in the genus *Telmatobius*, but absent in bufonids (Wiegmann, 1834). The exact species LeConte encountered and described is unclear, but he certainly believed Catesby's plate was unsuitable to describe a bufonid and made this point clear in his account of *Bufo musicus*.

Returning to Holbrook's initial dismissal of Schneider's *clamosus* epithet, it is possible Schneider partly intended to reference Catesby's "Land Frog." In his account Schneider credited Lacépède (1788) for the initial use of *clamosus*. Lacépède applied the species name in his publication a year earlier ascribing it to a Sardinian toad while also citing Catesby's plate 69—once again conflating species from two continents. Lacépède was a highly influential zoologist, however his rejection of the Linnaean binomial system limited the adoption of his names. Nonetheless, many later taxonomists appear to have drawn from his work, including Schneider (Dubois et al., 2021; Schmitt, 2010; Anonymous, 2005).

Another taxonomist influenced by Lacépède was Pierre Bonnaterre. His *Tableau Encyclopédique et Méthodique… Erpétologie* (1789) provided a full account of Catesby's *Rana terrestris* drawing directly from Catesby's text and describing in detail Catesby's plate 69. He was the first to formally apply Catesby's epithet *terrestris* within the Linnaean framework. This application may have been influenced by Lacépède's earlier use of Catesby's account and by Schneider's reference to a toad in North America in the same year.

Although nomenclatural confusion persisted through the 19th and 20th centuries, Stejneger and Barbour (1917) cited Bonnaterre in resurrecting *terrestris* for the Southern Toad, designating Catesby's plate 69 as the type specimen. Subsequent taxonomies have consistently recognized *terrestris* as the species epithet for the Southern Toad (Mendelson et al., 2025). Though its foundation rests on a legacy of misidentifications and lost puzzle pieces that complicates the reliability of both its type reference and type specimen.

## Discussion

The taxonomic history of *Anaxyrus terrestris* underscores the challenges of identifying herpetofauna faced by naturalists and taxonomists of the past—challenges that persist for herpetologists today. Early naturalists often relied on familiar reference points from their homelands to interpret the unfamiliar species they encountered in the New World. For instance, Catesby identified "The Land Frog" by drawing parallels to the European species *Bufo bufo*, grounding his observations in Old World experiences. This tendency toward international comparisons influenced subsequent accounts; Browne, for example, compared multiple species from different regions to describe a Jamaican anuran, and Lacépède drew on Catesby's work to describe an anuran from Sardinia. Such multiregional comparisons not only fueled confusion in accurately documenting animals like *Anaxyrus terrestris* but also distorted our understanding of historical habitats and populations.

Accurate interpretations of early naturalist depictions illuminate landscape changes over the last several centuries by providing information about historically common species that may be less abundant or nonexistent in South Carolina today. Such species declines and outright losses are largely due to anthropogenic influences. Early naturalist accounts benefit modern conservation strategies by documenting these trends. Examples from Catesby's work include bison, ivory-billed woodpeckers, and Carolina parakeets, all absent from today's southeastern landscape. Just as animals can disappear from a landscape over time, the reverse is also possible. Species can become more abundant as habitats shift. Such trends are more challenging to infer but can provide context for why a species like *Anaxyrus terrestris* was inaccurately depicted in the early 1700s.

The coastal plain habitats of Catesby's time differ significantly from what we observe today (Oswalt et al., 2012). Much of the region he visited would have been grasslands and pine savannas, habitats less frequented by *Anaxyrus terrestris*, but suitable for *Anaxyrus quercicus* and *Gastrophryne carolinensis*—possible models for Catesby's *Rana terrestris*. As a result of the rapid colonial-led expansion of agriculture and fire suppression, historic grassland habitats have transformed into the dense, hardwood forests of today, providing a more suitable landscape for, and increase in, *Anaxyrus terrestris*. The abundance of *Anaxyrus terrestris* later in the century may have influenced contemporary naturalists to reference Catesby's plate.

To further support this point, other creatures common to dense hardwood forests are missing from Catesby's publication. Hardwood forest denizens, like the Eastern Box Turtle (*Terrapene carolina*) and Copperhead (*Agkistrodon contortrix*), are not clearly depicted in Catesby's work (Reveal, 2013). Today's common animals that were not documented by Catesby are as telling of the habitats and health of ecosystems as the animals that were depicted by him. Where grasslands and savannas once supported bison and pitcher plants, hardwood forests support a different assemblage of organisms today. Inaccurate identifications of historical accounts challenge our ability to fully understand historic trends and have created deficiencies in modern conservation discussions about restoring historic native habitats.

We certainly encourage continued investigation into this story because several questions remain unresolved. What was the type specimen Linnaeus used for *Rana musica*? What species was *Telmatobius lentiginosus*, which LeConte declared was Catesby's "Land Frog"? Further, the etymological history of *Gastrophryne carolinensis* warrants closer study. We suggest this species may have contributed to the composite

identity of Catesby's frog. Holbrook (1836), in his remarks on *Engystoma carolinense* (now *Gastrophryne carolinensis*), noted its similarity to the South American *Engystoma surinamense* (now *Elachistocleis surinamensis*)—a connection echoing the persistent confusion surrounding Linnaeus's Suriname locality. Examining how early naturalists classified *carolinensis* may shed new light on the origins of Catesby's account.

Although Catesby and his contemporaries provide foundational insights into the natural history of South Carolina, prudence is necessary for analyzing and referencing their work. Ambiguous identifications should remain speculative to avoid perpetuating false information about the habitats and ecosystems of the past. We are not the first to recognize uncertainties in Catesby's plate; Holbrook (1838) and LeConte (1855) also documented their challenges in interpreting Catesby's account. We do not intend to suggest a taxonomic name change for *Anaxyrus terrestris*. Rather we bring this note to the herpetological community to highlight the confusing taxonomic history of this widespread anuran as an example of a misleading scientific reference that influences more than our understanding of the species.

## Acknowledgements

We thank the late Rudy Mancke (University of South Carolina) for making us aware of the discrepancy between the original description of the Southern Toad (*Anaxyrus terrestris*) by Pierre Joseph Bonnaterre in 1789 (original binomial *Rana terrestris*) and the designated type specimen, an illustration by Mark Catesby several decades earlier. We appreciate comments offered by John Byrd (Clinch River Environmental Studies Organization), Parker W. Gibbons (Naturalist with Barrier Island Ecotours), and Juliana Zadik (Environmental Long-Range Planner for Beaufort County) on a draft of the final manuscript. We acknowledge and thank Ian Fisher for examining museum specimens at the Carnegie Museum of Natural History as we attempted to make sense of historical herpetological accounts. Thank you to the reviewers of Bibliotheca Herpetologica, particularly Breck Bartholomew and Chris Bell, whose insights helped expand and inspire deeper investigation into this history and potential origins of this discrepancy. ChatGPT (versions 4.0 & 5.0) was used for the translation of many of the historical references cited in this manuscript. Investigative research was aided by the US Department of Energy Financial Assistance Award no. DE-EM0004391 to the University of Georgia Research Foundation.

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**We suggest the following format for citing this article:**
Zadik, J. and J. W. Gibbons. 2026. From Catesby's Land Frog to *Anaxyrus terrestris*: Reevaluating the Type Specimen of the Southern Toad. *Bibliotheca Herpetologica* 20(2):13–20.